

DETAILED ACTION

Response to Amendment

1. Applicant's arguments filed February 10, 2011 have been fully considered but they are not persuasive. Applicant's argument with respect to claims 1, 5 and 9 are all based on the assertion that Augusto (US 2002.0101895) does not read on the claims because he does not refer to a predefined wavelength λ . However, given that this wavelength is referred to only symbolically and is otherwise undefined, any reference to a similar spectrum reads on the claims. Notwithstanding the discussion in the disclosure the claims are too broad and indefinite to distinguish over the prior art. Therefore the rejection is made final.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 2, 4 – 10, 13 – 15, 21, 22, 24 – 27, 29, 32 – 37 are rejected under 35 U.S.C. 102(b) as being anticipated by Augusto (US2002/0101895 A1).

4. As to claim 1, Augusto discloses a radiation detector for detecting radiation according to a predefined spectral sensitivity distribution that exhibits a maximum at a predefined wavelength λ_0 , comprising a semiconductor body with an active region serving to generate a detector signal and intended to receive radiation, wherein said active region comprises a plurality of functional layers, at least two of said functional

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layers having different band gaps, each one of the functional layers being implemented to absorb at least some of the radiation, and wherein at least a part of said functional layers absorbs radiation in a wavelength range that includes wavelengths greater than the wavelength λ_0 . (Paragraphs [0175]-[0191]. Note that while Augusto uses different terminology, he discloses a multilayered detector that uses at least two different layers having differing band gaps absorbing a different portion of the spectrum.

5. As to claim 2, Augusto discloses the spectral sensitivity distribution of the human eye. Where Augusto states that the detector responds to the visible spectrum. (Paragraph [0176].

6. As to claim 4, Augusto discloses disposed after said active region is a filter layer structure comprising at least one filter layer, which filter layer structure determines the short-wave side of the detector sensitivity in accordance with the predefined spectral sensitivity distribution by absorbing radiation in a wavelength range that includes wavelengths smaller than λ_0 . (Paragraphs [0177-0179]).

7. As to claim 9, Augusto discloses a radiation detector for detecting radiation in accordance with a predefined spectral sensitivity distribution that exhibits a maximum at a predefined wavelength λ_0 , comprising a semiconductor body with an active region serving to generate detector signals and intended to receive radiation, wherein said active region comprises a plurality of functional layers, at least two of said functional layers having different band gaps and each of the functional

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layers is implemented to absorb at least some of the radiation, and wherein disposed after said active region is a filter layer structure comprising at least one filter layer, which filter layer structure determines the short-wave side of said detector sensitivity in accordance with said predefined spectral sensitivity distribution by absorbing radiation in a wavelength range that includes wavelengths smaller than λ_0 . . (Paragraphs [0175]-[0191].

8. As to claim 10, Augusto discloses the spectral sensitivity distribution is that of the human eye, . Where Augusto states that the detector responds to the visible spectrum. (Paragraph [0176].

9. As to claim 13, Augusto discloses functional layers at least partially absorb radiation in a wavelength range that includes wavelengths greater than the wavelength λ_0 . Since Augusto discloses that the detector covers the visible spectrum and since applicant defines λ_0 as the nominal center of the visible spectrum the range is covered.

10. As to claim 14, Augusto discloses the functional layers have different thickness. (Paragraph [0187]).

11. As to claim 15, Augusto discloses the filter layer structure is disposed after said active region in the direction of the incident radiation. (Paragraphs [0196-207]).

12. As to claim 21, Augusto discloses the filter layer structure comprises a plurality of filter layer of different band gaps and/or thickness. (Paragraphs [0196-207]).

13. AS to claim 22, Augusto discloses the filter layer structure determines the short-wave side of said detector sensitivity by absorbing radiation via a direct band gap of the

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respective filter layer in a wavelength range that includes wavelengths smaller than λ_0 . (Paragraphs [0194-0195]).

14. As to claim 24, Augusto discloses the functional layers determine by their implementation the long-wave side of said detector sensitivity in accordance with said predefined spectral sensitivity distribution for wavelengths greater than λ_0 . (Paragraph [0194-0195]).

15. As to claim 25, Augusto discloses the respective band gaps of functional layers disposed one after the other in said semiconductor body at least partially increase in the direction of the incident radiation. (Paragraph [0192]).

16. As to claim 26, Augusto discloses the functional layers or at least a portion of said functional layers are substantially undoped. (Paragraphs [0079 – 0080]).

17. As to claim 27, Augusto discloses the active region comprises at least one heterostructure. (Paragraphs [0196-0207]).

18. As to claim 29, and , Augusto discloses the semiconductor body particularly the semiconductor body comprising said filter layer structure in monolithically integrated. (Paragraph [0085]).

19. As to claim 32 and 34, Augusto discloses the active region corresponds to a continuous, intrinsic region of the semiconductor body. (Paragraph [0085]).

20. As to claim 35 and 37, Augusto discloses the functional layers are epitaxial layers that form a monolithically integrated active region. (Paragraph [0085])

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21. As to claims 38 and 40, Augusto discloses functional layers are consecutive layer in a layer stack, and wherein each functional layer is in direct contact with adjacent functional layer in the layer stack. (Paragraphs [0196-0207]).

Claim Rejections - 35 USC § 103

22. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

23. Claims 3, 5-8, 23, 28, 30, 31, 33, 36, and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Augusto in view of Major et al., (USPAT 5,689,123) hereinafter Major..

24. As to claims 3 and 11, Augusto discloses various material systems for forming the active layers but indicates a preference for a Silicon compatible system and thus does not expressly disclose the semiconductor body contains at least one III/V semiconductor material.

25. Major is related to a similar optoelectronic device and discloses at least one III/V semiconductor material. (Column 3, lines 50-58).

26. Major is evidence that a person of ordinary skill in the art would find a reason, suggestion or motivation to use at least one III/V semiconductor material.

27. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Augusto by using at least one III/V semiconductor material for advantages such as growth of a cubic crystal lattice

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28. according to the teachings of Major. (Column 3, lines 42-48).

29. As to claim 5, Augusto as modified by Major discloses a radiation detector for detecting radiation in accordance with the predefined spectral sensitivity distribution of the human eye, which exhibits a maximum at the wavelength λ_0 , comprising a semiconductor body with an active region serving to generate a detector signal and intended to receive radiation, wherein said semiconductor body contains at least one III/V semiconductor material and said active region comprises a plurality of functional layers, and wherein each one of said functional layers is configured to absorb at least some of the radiation. (Augusto, Paragraphs [0175]-[0191] and Major, column 3, lines 50-58).

30. As to claim 6, Augusto as modified by Major discloses functional layers at least partially absorb radiation is a wavelength range that includes wavelengths greater than the wavelength λ_0 . Since Augusto discloses that the detector covers the visible spectrum and since applicant defines λ_0 as the nominal center of the visible spectrum the range is covered.

31. As to claim 7, Augusto as modified by Major discloses the functional layers have different thickness. (Paragraph [0187]).

32. As to claim 8, Augusto as modified by Major discloses the filter layer structure determines the short-wave side of said detector sensitivity by absorbing radiation via a direct band gap of the respective filter layer in a wavelength range that includes wavelengths smaller than λ_0 . (Paragraphs [0194-0195]).

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33. As to claim 28, Augusto as modified by Major discloses the active region, particularly the functional layers contains at least on III/V semiconductor material. (Major .Column 3, lines 50-58).

34. As to claims 30 and 31, Augusto as modified by Major discloses the at least one III/V semiconductor material comprises a material having a composition $\text{In}_x\text{Ga}_y\text{Al}_{1-x-y}\text{P}$, $\text{In}_x\text{Ga}_y\text{Al}_{1-x-y}\text{As}$, or $\text{In}_x\text{Ga}_y\text{Al}_{1-x-y}\text{N}$, wherein in each case $0 \leq x \leq 1$, $0 \leq y \leq 1$ and $x + y \leq 1$. (Major, column 9, lines 14-51).

35. As to claim 33, Augusto as modified by Major discloses the active region corresponds to a continuous, intrinsic region of the semiconductor body. (Paragraph [0085])

36. As to claim 36, Augusto as modified by Major discloses the functional layers are epitaxial layers that form a monolithically integrated active region. (Paragraph [0085])

37. As to claim 39, Augusto as modified by Major discloses functional layers are consecutive layer in a layer stack, and wherein each functional layer is in direct contact with adjacent functional layer in the layer stack. (Paragraphs [0196-0207]).

38. As to claim 23, Augusto as modified by Major discloses the claimed invention except for the filter layer having a thickness of 1 μm or less. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to adjust the filter layer thickness, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Bosch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Allowable Subject Matter

39. Claims 16-20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

40. The following is a statement of reasons for the indication of allowable subject matter: The prior art of record, taken alone or in combination fails to anticipate or render obvious a filter layer structure comprises a single filter layer having a direct band gap and an indirect band gap as recited in claim 16.

Conclusion

41. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PAUL E. PATTON whose telephone number is

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(571)272-9762. The examiner can normally be reached on 7:00 - 5:30 Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith can be reached on 571-272-2429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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